

TA-4650

USA Model
(former and new types)

E Model

AEP Model



INTEGRATED STEREO AMPLIFIER

SPECIFICATIONS

GENERAL

System: Power amplifier section:
direct-coupled pure complementary
symmetry circuitry
Preamplifier:
direct-coupled two-stage phono,
flat and negative feed-back control
circuitry

Power Requirements: 120 V ac, 60 Hz (USA model)
110, 127, 220 or 240 V ac, 50/60 Hz,
adjustable (AEP model)
100, 120, 220 or 240 V ac, 50/60 Hz,
adjustable (E model)

Power Consumption: 270W (by IEC Standard)

Dimensions: approx.
460(w) x 168(h) x 323(d) mm,
18 1/8 x 6 5/8 x 12 3/4 inches (AEP model)
430(w) x 168(h) x 323(d) mm,
16 7/8 x 6 5/8 x 12 3/4 inches (E, USA model)
including projecting parts and controls

Weight: approx.
12.4 kg, 27 lb 5 oz (AEP model) in net
11.5 kg, 25 lb 6 oz (E, USA model)
15.2 kg, 33 lb 8 oz with shipping carton
(AEP model)
13.6 kg, 30 lb (E, USA model)

POWER AMPLIFIER SECTION

Continuous RMS Power Output:
(less than 0.1% THD,
both channels driven
simultaneously)
at 1 kHz
35 + 35W (8 Ω)
30 + 30W (4 Ω)
at 20 – 20,000 Hz
30 + 30W (8 Ω)
according to DIN 45500
35 + 35W

Dynamic Power Output: 100W (8 Ω)
(IHF constant power
supply method)
90W (4 Ω)

Power Bandwidth (IHF): 5 Hz – 70 kHz

Harmonic Distortion: less than 0.1% at rated output
less than 0.05% at 1W output
Distortion: less than 0.1% at rated output
(60 Hz: 7 kHz = 4:1)
less than 0.05% at 1W output

Frequency Response: 2 Hz – 100 kHz ± 0.2 dB
(at 1W output)

S/N ratio: greater than 110 dB, short-circuited
input

Residual Noise: less than 0.005 μ W (8 Ω)

Damping Factor: 45 (8 Ω , at 1 kHz)

Inputs: POWER INPUT
sensitivity 1V RMS (for rated output)
impedance 50 k Ω

Outputs: SPEAKER terminals A, B
accept speakers of 4 Ω or more
HEADPHONE jack
accepts low- and high-impedance stereo
headphones

(Continued on next page.)

SONY®

SERVICE MANUAL

PREAMPLIFIER SECTION

Harmonic Distortion:	less than 0.05 % at rated output
Intermodulation (IM) Distortion:	less than 0.05 % at rated output (60 Hz: 7 kHz = 4:1)
Frequency response:	PHONO 1, 2 RIAA equalization ± 0.5 dB TUNER AUX 1, 2 TAPE 1, 2 REC/PB (input) EXT ADPT 1, 2 (input) } 10 Hz - 100 kHz $\pm 0_{-2}$ dB
Tone Controls:	BASS: ± 10 dB at 50 Hz (TURNOVER 250 Hz) ± 10 dB at 100 Hz (TURNOVER 500 Hz) TREBLE: ± 10 dB at 10 kHz (TURNOVER 2.5 kHz) ± 10 dB at 20 kHz (TURNOVER 5 kHz)
Filters:	LOW: 6 dB/octave attenuation below 35 Hz HIGH: 6 dB/octave attenuation above 6 kHz
Loudness Switch:	+10 dB at 50 Hz (att. 30 dB) +3 dB at 10 kHz

Inputs

	Sensitivity	Impedance	Maximum input capability*	S/N (weighting network)
PHONO 1, 2	2.5 mV	50 k Ω	300 mV	greater than 70 dB (B)
AUX 1, 2 TAPE 1, 2 REC/PB (input) EXT ADPT 1, 2 (input)	150 mV	100 k Ω		greater than 90 dB (A)

* The maximum input capability is measured at a 0.05 % harmonic distortion.

Outputs

	Output voltage	Impedance
REC OUT 1, 2	150 mV	4.7 k Ω
PRE OUTPUT	1 V	3 k Ω
REC/PB	17 mV	82 k Ω
EXT ADPT 1, 2	150 mV	4.7 k Ω

Specification Label:

USA model

SONY®	INTEGRATED STEREO AMPLIFIER
	MODEL NO. TA-4650
	AC 120V 60Hz 130W
	SERIAL NO. _____
MADE IN JAPAN	

AEP model

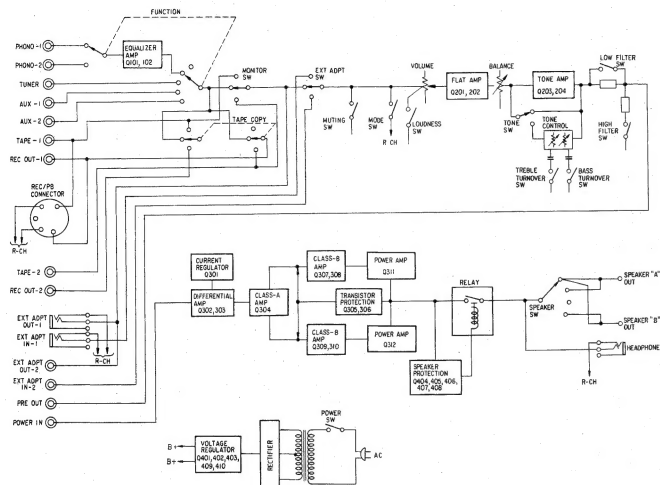
SONY®	INTEGRATED STEREO AMPLIFIER
	MODEL NO. TA-4650
	AC 110.127.220.240V ~ 50/60Hz 270W
	SERIAL NO. _____
MADE IN JAPAN	

E model

SONY®	INTEGRATED STEREO AMPLIFIER
	MODEL NO. TA-4650
	AC 100.120.220.240V 50/60Hz 270W
	SERIAL NO. _____
MADE IN JAPAN	

SECTION 1 OUTLINE

1-1. BLOCK DIAGRAM



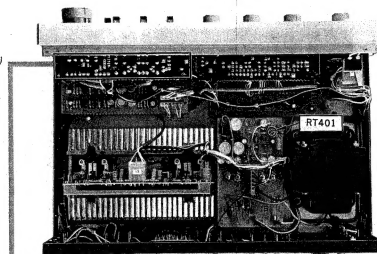
SECTION 2 ADJUSTMENTS

Note: Turn POWER on and allow about three minutes for warm-up.

2-1. POWER SUPPLY VOLTAGE ADJUSTMENT

See Fig. 2-1 and 2-2.

B (volume control)
board



Adjust RT401 for
20 V reading on the
meter with no signal
input.

Fig. 2-1.

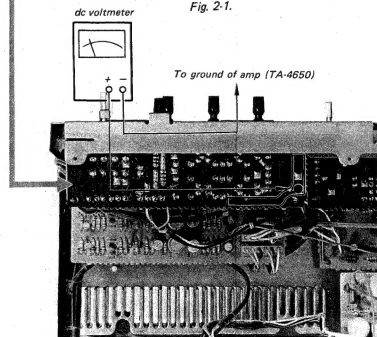


Fig. 2-2.

2.2. DC BIAS ADJUSTMENT

Adjust RT301 and RT351 for 75 mV reading on the meter with no signal input.

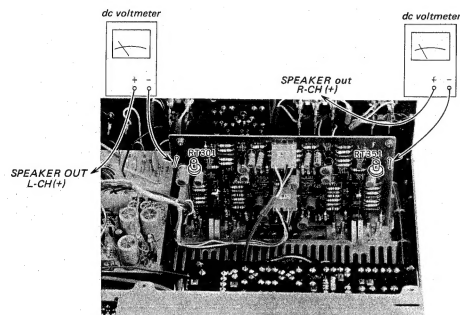
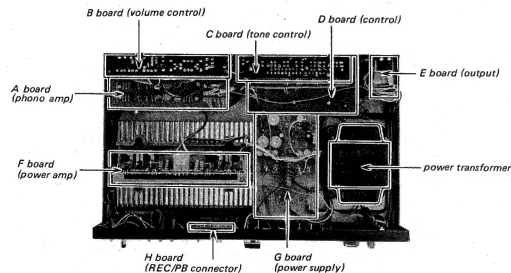


Fig. 2-3.

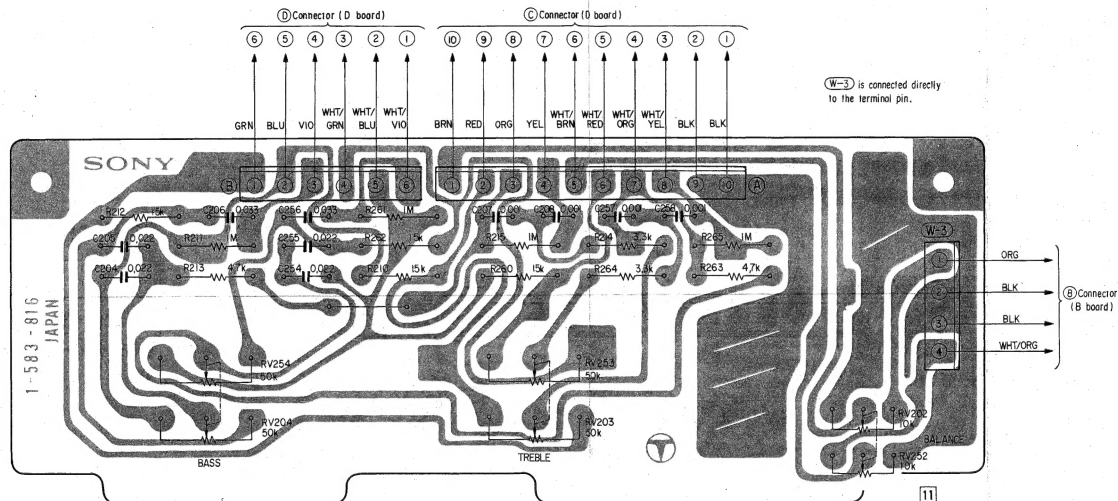
2.3. CHASSIS LAYOUT



MEMO

SECTION 3 DIAGRAMS

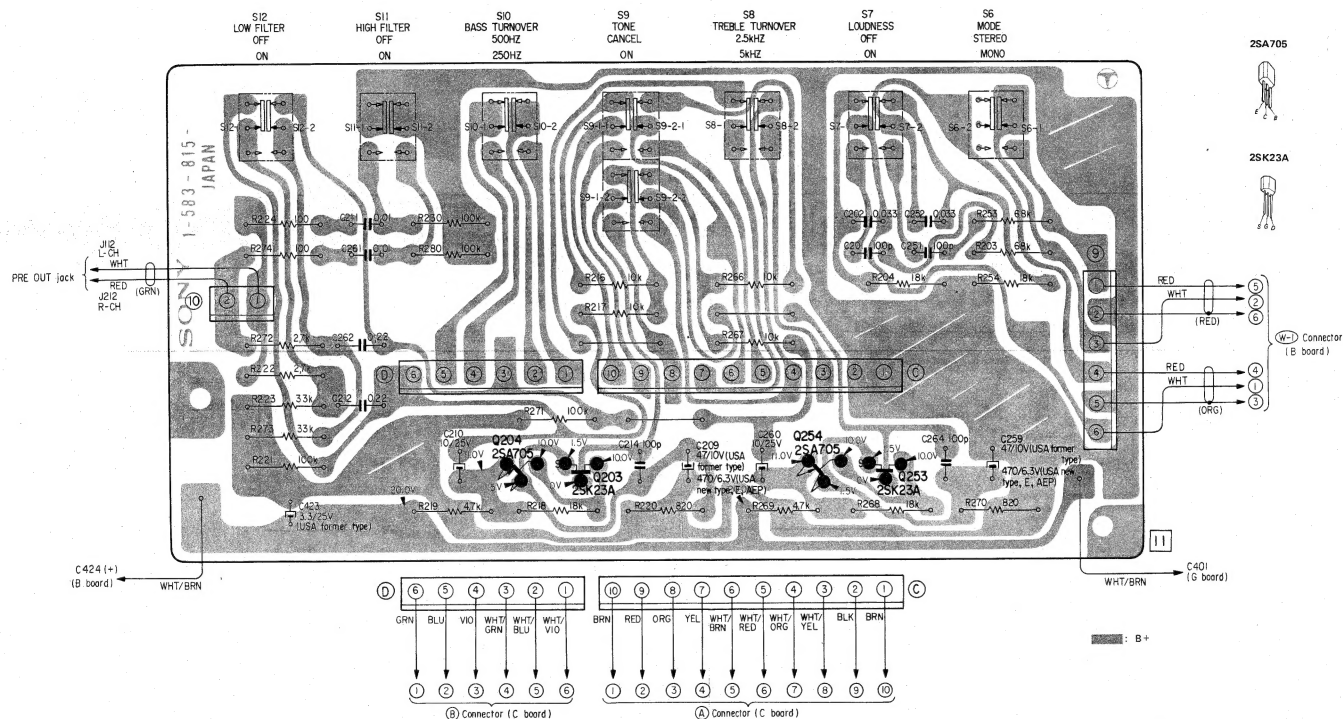
3-1. MOUNTING DIAGRAM — C Board (tone control) —



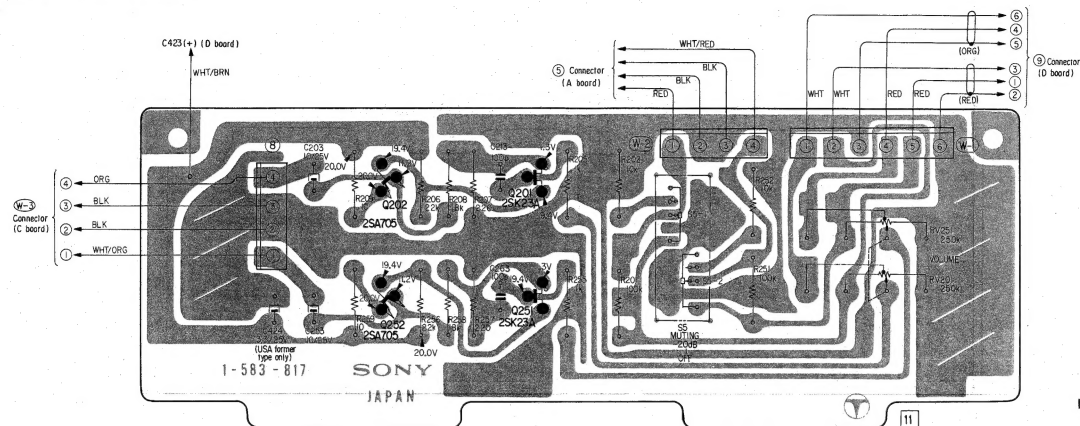
Note: The lead wires of connector (W-3) should wire-wrap the terminal pins of connector (8) on B board.

3-2. MOUNTING DIAGRAM - D Board (control) -

- Conductor Side -



3-3. MOUNTING DIAGRAM - B Board (volume control) -
- Conductor Side -

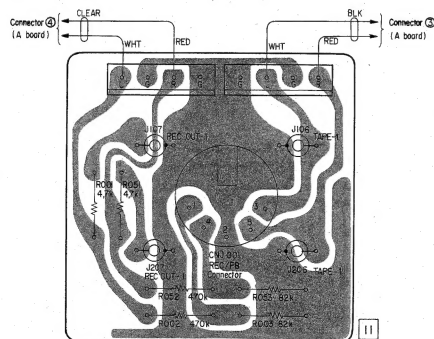


2SA705

2SK23A



3-4. MOUNTING DIAGRAM - H Board (REC/PB connector)
- Conductor Side -

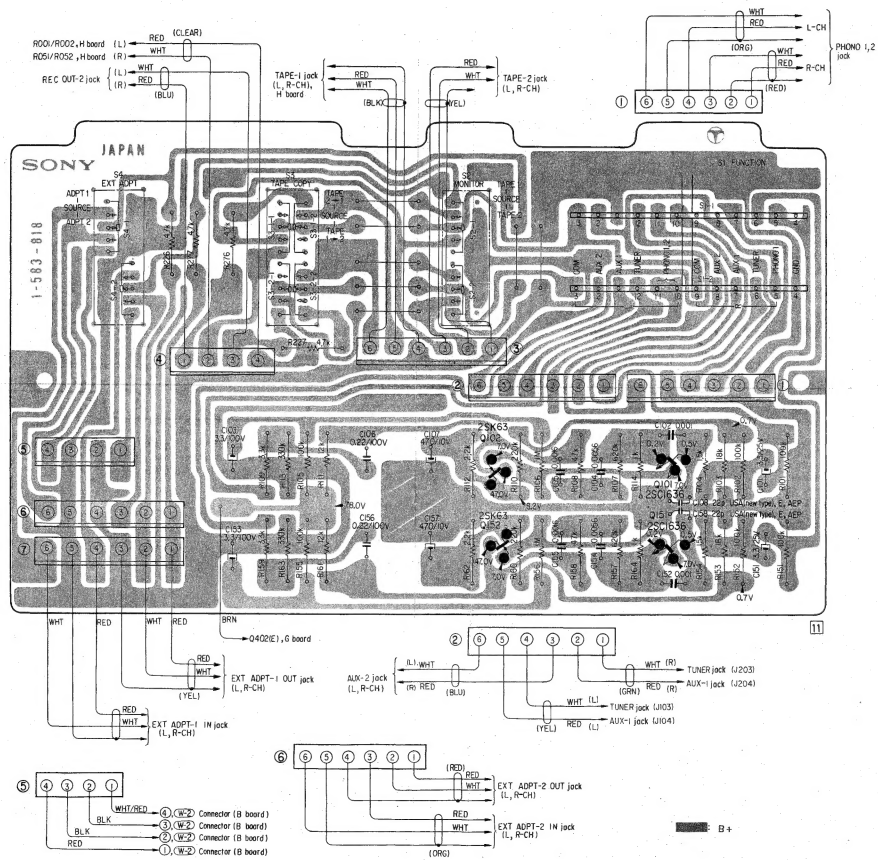


Note: The lead wires of connectors (W-1) - (W-2) should wire-wrap the terminal pins of connectors ⑤ (A board) and ⑥ (D board), respectively.

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3-5. MOUNTING DIAGRAM — A Board (phono amp) —

— Conductor Side —



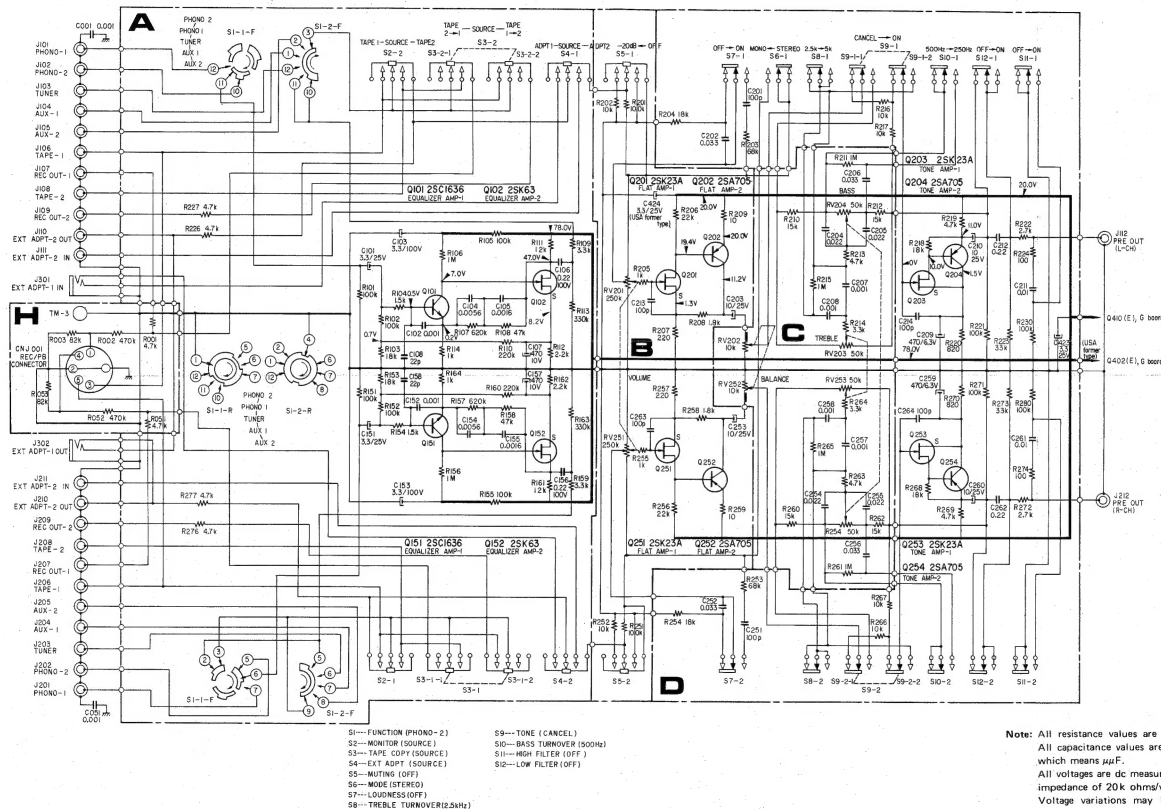
2SK63



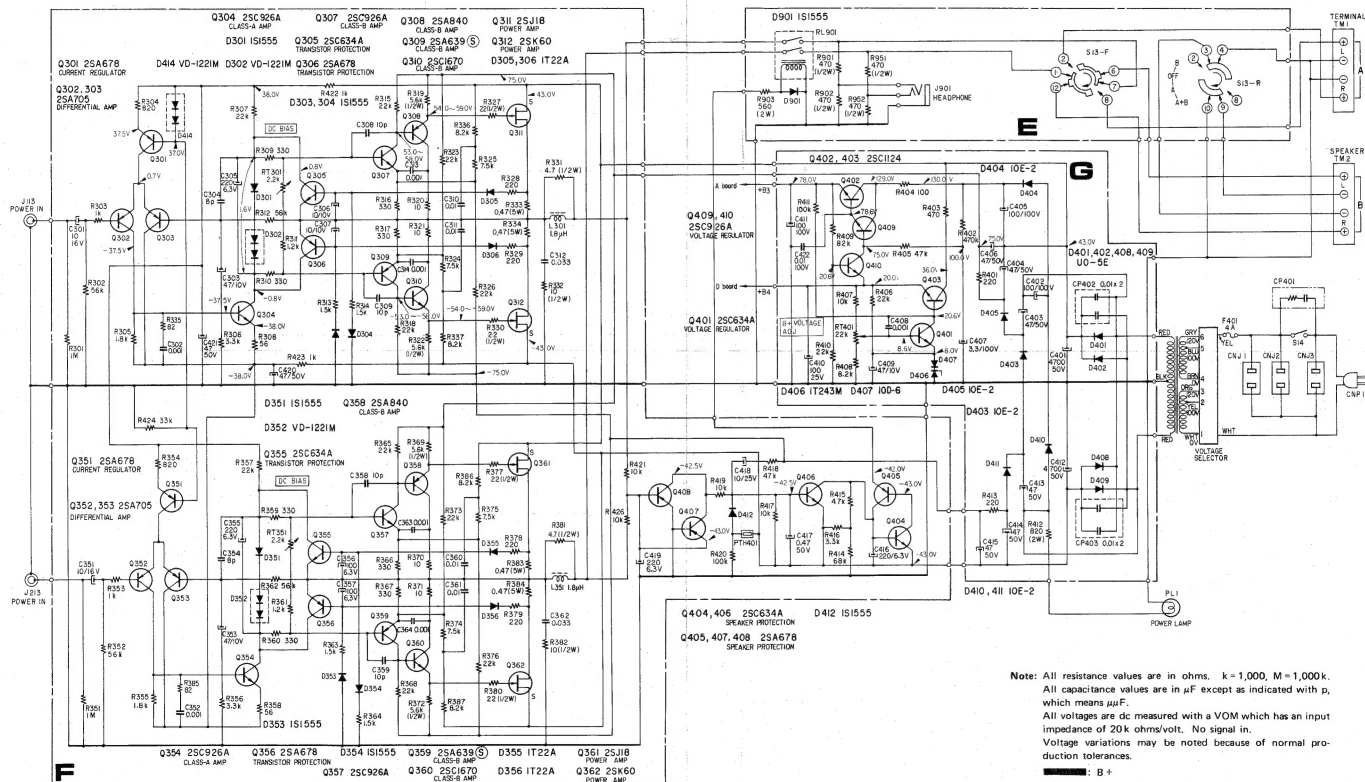
2SC1636



3.6. SCHEMATIC DIAGRAM -- Preamplifier Section --



3-7. SCHEMATIC DIAGRAM — Power Amplifier Section —
— USA model (former type) —

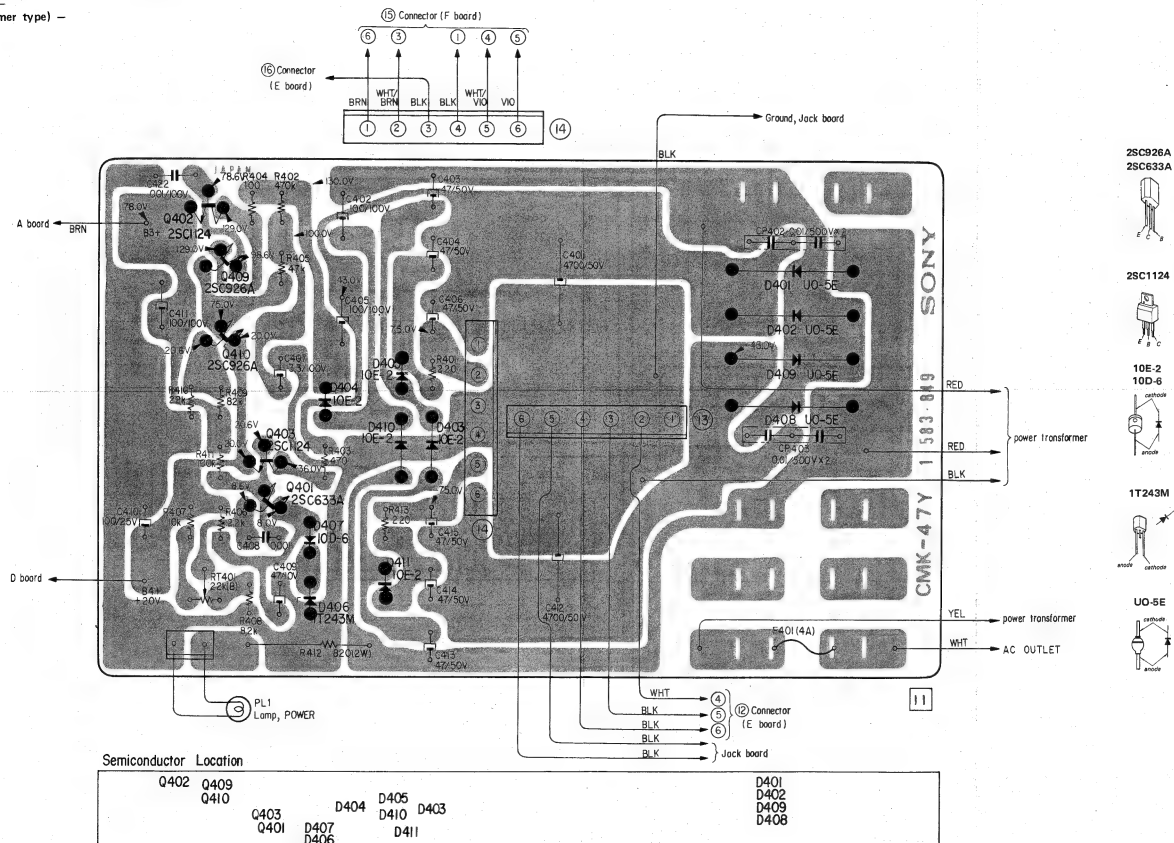


Note: All resistance values are in ohms. k=1,000, M=1,000k.
All capacitance values are in μF except as indicated with p, which means μF .
All voltages are dc measured with a VOM which has an input impedance of 20k ohms/volt. No signal in.
Voltage variations may be noted because of normal production tolerances.

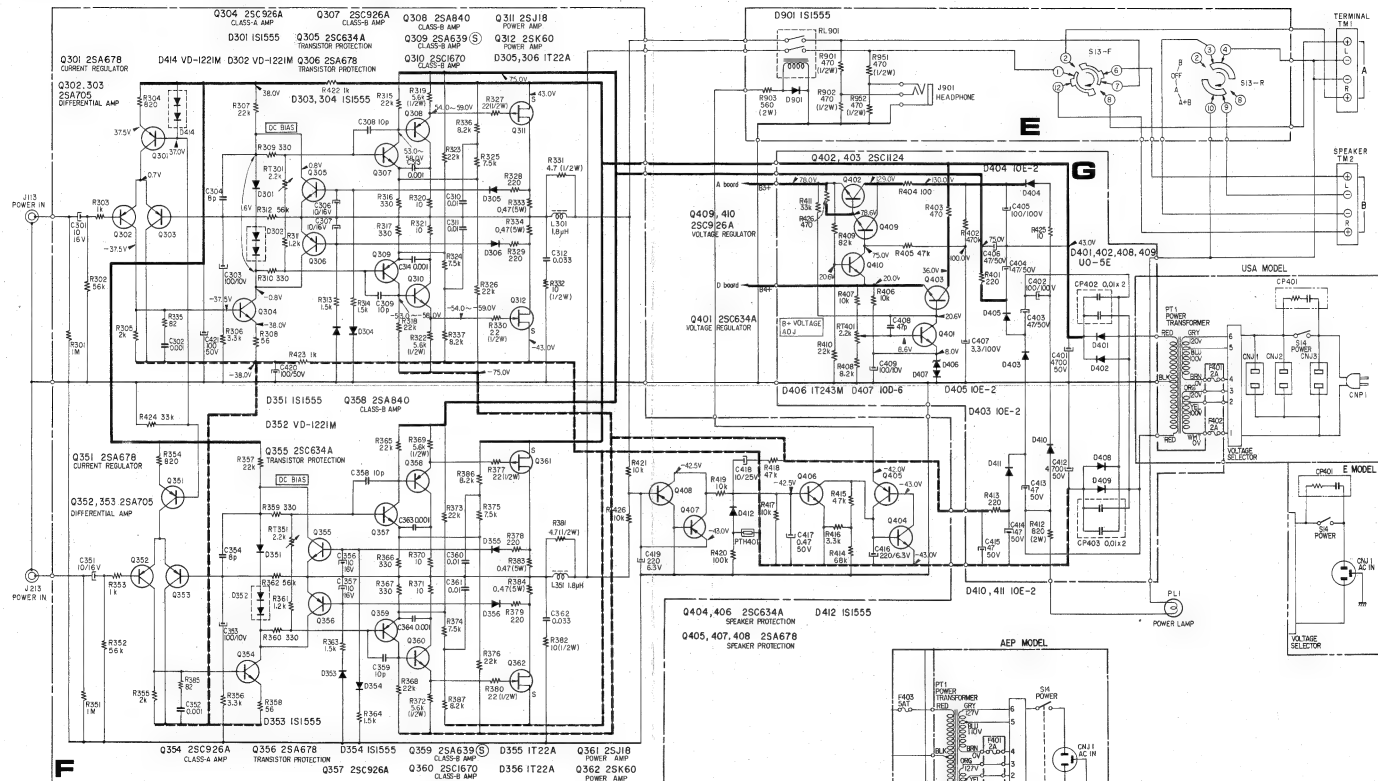
— B +

3-8. MOUNTING DIAGRAM - G Board (power supply) -

- Conductor Side -
- USA model (former type) -



3.9. SCHEMATIC DIAGRAM — Power Amplifier Section — — USA (new type), E, AEP model —



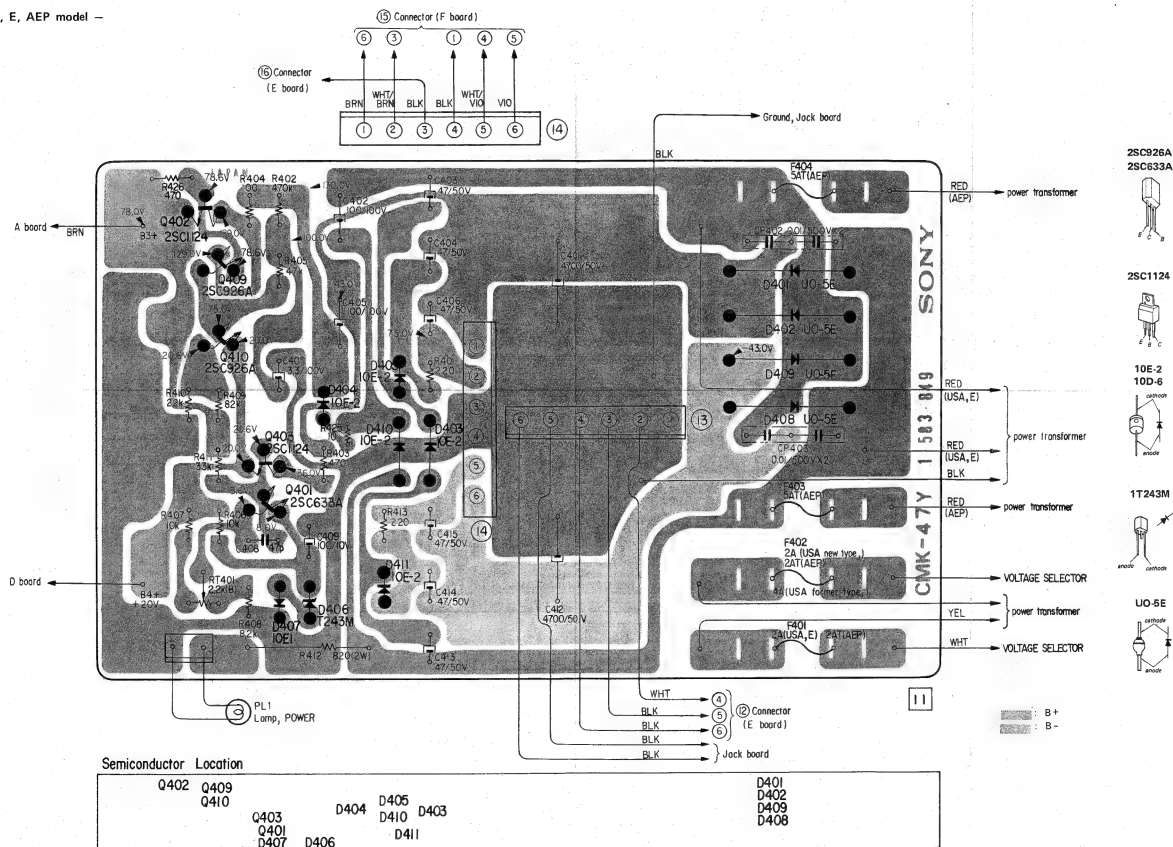
Note: All resistance values are in ohms. $k=1,000$, $M=1,000,000$.
All capacitance values are in μF except as indicated with p, which means pF .
All voltages are dc measured with a VOM which has an input impedance of 20k ohms/volt. No signal in.
Voltage variations may be noted because of normal production tolerances.

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3-10. MOUNTING DIAGRAM — G Board (power supply) —

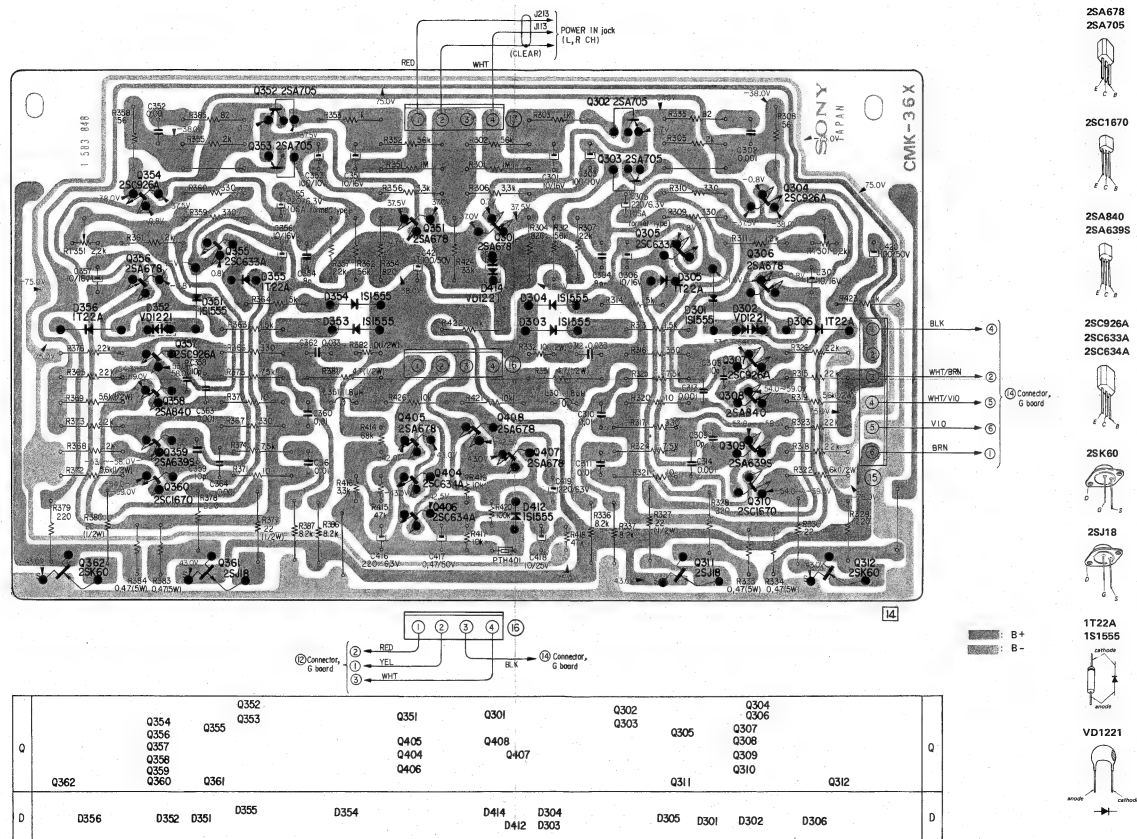
Conductor Side —

— USA (new type), E, AEP model —



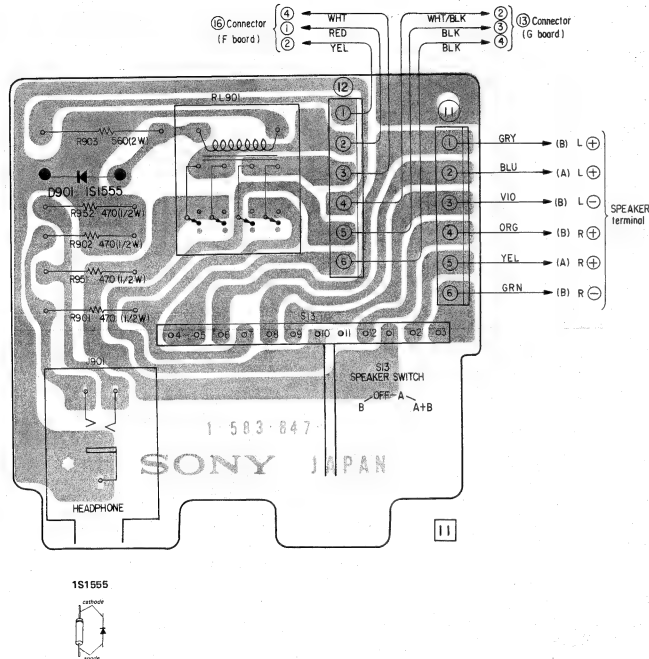
3-11. MOUNTING DIAGRAM — F Board (power amp) —

— Conductor Side —



3-12. MOUNTING DIAGRAM - E Board (output) -

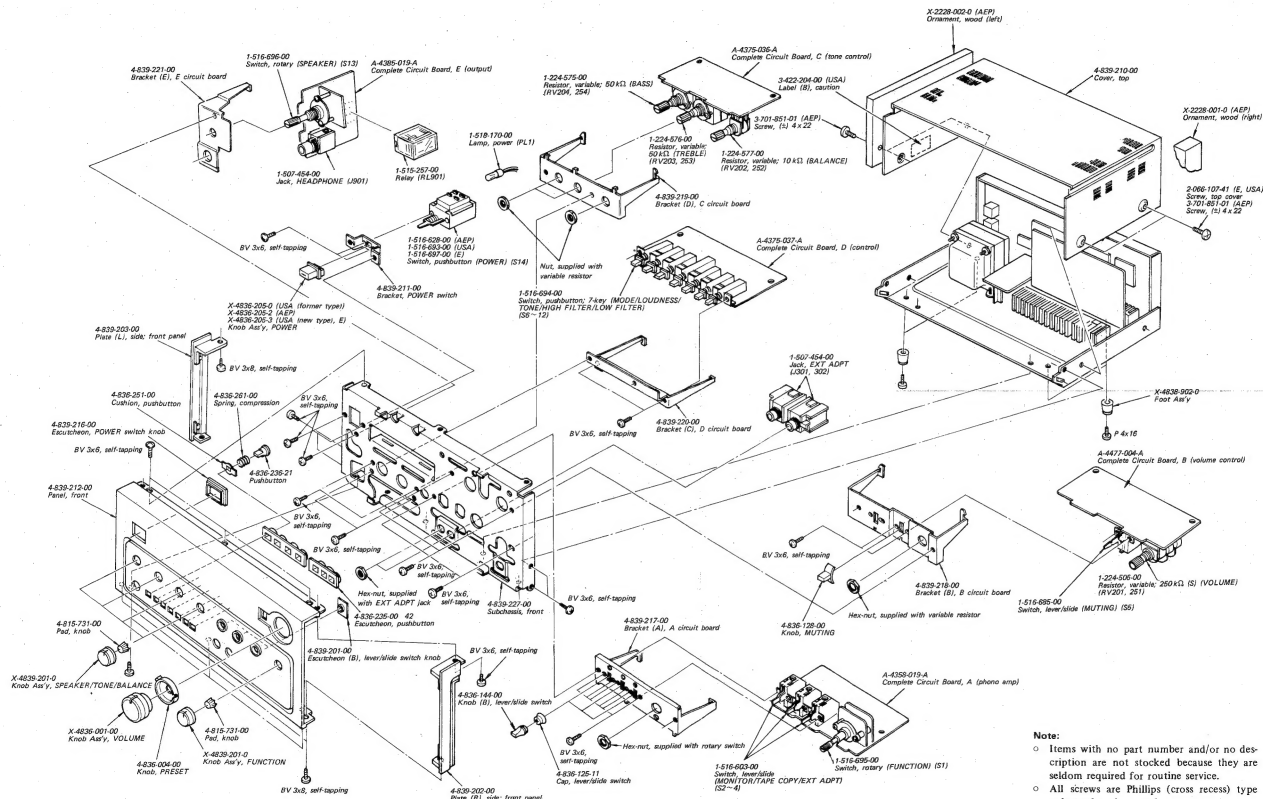
- Conductor Side -



MEMO

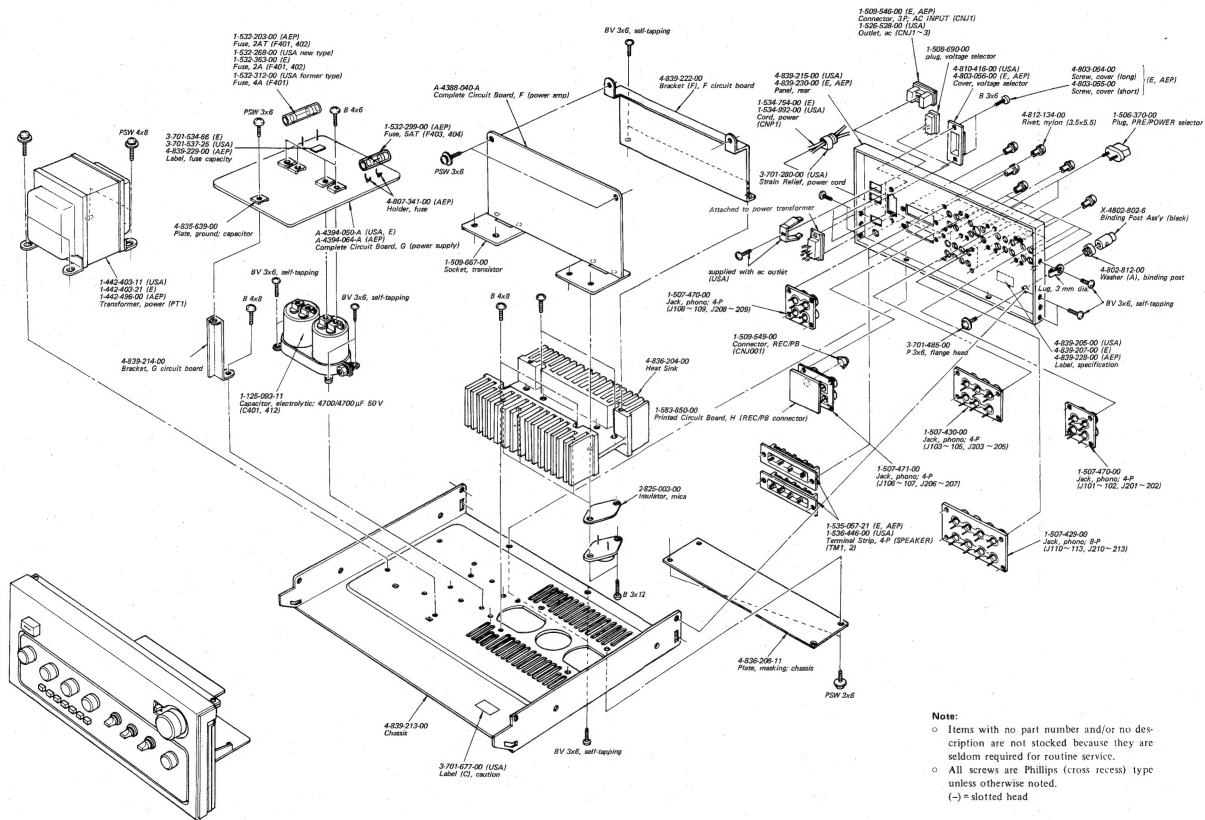
SECTION 4 EXPLODED VIEWS

4-1.



Note:

- Items with no part number and/or no description are not stocked because they are seldom required for routine service.
- All screws are Phillips (cross recess) type unless otherwise noted.
- (-) = slotted head



Note:

- Items with no part number and/or no description are not stocked because they are seldom required for routine service.
- All screws are Phillips (cross recess) type unless otherwise noted.

(-) = slotted head

SECTION 5

ELECTRICAL PARTS LIST

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description	Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
CIRCUIT BOARDS			Q404	2SC634A		C104(C154)	1-105-510-12	0.0056 mylar	C402	1-123-084-11	100 100 V
Note: For USA model, former and new B, D, F and G boards are interchangeable respectively.			Q405	2SA678		C105(C155)	1-106-006-12	0.0016 mylar	C403,C404	1-123-058-11	47 50 V
			Q406	2SC634A		C106(C156)	1-105-729-12	0.22 100 V mylar	C405	1-123-084-11	100 100 V
			Q407,Q408	2SA678		C107(C157)	1-121-425-11	470 10 V	C406	1-123-058-11	47 50 V
			Q409,Q410	2SC926A							
A-4358-019-A	A (phono amp), complete		Diodes			C201(C251)	1-102-973-11	100 p ceramic	C407	1-121-995-11	3.3 100 V
A-4477-004-A	B (volume control), complete		D301(D351)	1S1555		C202(C252)	1-105-679-12	0.033 mylar	C408	1-105-661-12	0.001 mylar (USA former type)
A-4375-036-A	C (tone control), complete		D302(D352)	VD1221M		C203(C253)	1-121-748-11	10 25 V		1-101-881-11	47 p (USA new type, E, AEP model)
A-4375-037-A	D (control), complete		D303(D353)	1S1555		C204(C254)	1-105-677-12	0.022 mylar			
A-4385-019-A	E (output), complete		D304(D354)	1S1555		C205(C255)	1-105-677-12	0.022 mylar	C409	1-121-352-11	47 10 V (USA former type)
A-4388-040-A	F (power amp), complete		D305(D355)	1T22A		C206(C256)	1-105-679-12	0.033 mylar	C409	1-121-414-11	100 10 V (USA new type, E, AEP model)
A-4394-050-A	G (power supply), complete (USA, E model)		D306(D356)	1T22A		C207(C257)	1-105-661-12	0.001 mylar			
A-4394-064-A	G (power supply), complete (AEP model)					C208(C258)	1-105-661-12	0.001 mylar	C410	1-121-935-11	100 25 V (USA former type)
1-583-850-00	H (REC/PB connector)					C209(C259)	1-121-352-11	47 10 V (USA former type)	C411	1-123-084-11	100 100 V (USA former type)
							1-121-424-11	470 6.3 V (USA new type, E, AEP model)			
SEMICONDUCTORS			D401,D402	1U0-SE		C210(C260)	1-121-748-11	10 25 V	C412	1-125-093-11	4700 50 V
Transistors			D403-D405	10E-2		C211(C261)	1-105-673-12	0.01 mylar	C413-C415	1-123-058-11	47 50 V
			D406	1T243M		C212(C262)	1-105-689-12	0.22 mylar	C416	1-121-419-11	220 6.3 V
			D407	10D-6		C213(C263)	1-102-973-11	100 p ceramic	C417	1-121-726-11	0.47 50 V
			D408,D409	1U0-SE		C214(C264)	1-102-973-11	100 p ceramic	C418	1-121-398-11	10 25 V
									C419	1-121-419-11	220 6.3 V
Q101(Q151)	2SC1636		D410,D411	10E-2		C301(C351)	1-121-916-11	10 16 V	C420,C421	1-121-411-11	47 50 V (USA former type)
Q102(Q152)	2SK63 (FET)		D412,D413	1S1555		C302(C352)	1-105-661-12	0.001 mylar		1-121-417-00	100 50 V (USA new type, E, AEP model)
Q201(Q251)	2SK23A (FET)		D414	VD1221		C303(C353)	1-121-352-11	47 10 V (USA former type)	C423,C424	1-121-392-11	3.3 25 V (USA former type)
Q202(Q252)	2SA705		D901	1S1555			1-121-414-11	100 10 V (USA new type, E, AEP model)			
Q203(Q253)	2SK23A (FET)		TRANSFORMER AND INDUCTORS			C304(C354)	1-102-945-11	8 p ceramic	RESISTORS		
Q204(Q254)	2SA705		L301(L351)	1-407-592-00	Microinductor, 1.8 μ H	C305(C355)	1-121-419-11	220 6.3 V (USA former type)	All resistors are in Ω , $\frac{1}{2}$ W, $\pm 5\%$, carbon resistors (except special type) are omitted. Check schematic diagram for the resistance values. ($k=1,000$, $M=1,000k$)		
Q301(Q351)	2SA678		PT1	1-442-403-11	Transformer, power (USA model)	C306(C356)	1-121-413-11	100 6.3 V (USA former type)	R331(R381)	1-202-517-11	4.7 $\frac{1}{2}$ W composition
Q302(Q352)	2SA705			1-442-403-21	Transformer, power (E model)		1-121-651-11	10 16 V (USA new type, E, AEP model)	R332(R382)	1-202-525-11	10 $\frac{1}{2}$ W composition
Q303(Q353)	2SA705			1-442-496-00	Transformer, power (AEP model)	C307(C357)	1-121-413-11	100 6.3 V (USA former type)	R333(R383)	1-217-158-11	0.47 5 W metal
Q304(Q354)	2SC926A						1-121-651-11	10 16 V (USA new type, E, AEP model)	R334(R384)	1-217-158-11	0.47 5 W metal
Q305(Q355)	2SC634A					C308(C358)	1-102-947-11	10 p ceramic	R412	1-206-662-11	820 2 W metal-oxide
Q306(Q356)	2SA678		CAPACITORS			C309(C359)	1-102-947-11	10 p ceramic	R901(R951)	1-202-565-11	470 $\frac{1}{2}$ W composition
Q307(Q357)	2SC926A		Capacitors are in μ F, electrolytic type unless otherwise noted. ($p=\mu$) The working voltage of 50 volts or less are omitted except for electrolytic type.			C310(C360)	1-105-673-12	0.01 mylar	R902(R952)	1-202-565-11	470 $\frac{1}{2}$ W composition
Q308(Q358)	2SA840								R903	1-206-658-11	560 2 W metal-oxide
Q309(Q359)	2SA639S		C001(C051)	1-102-074-11	0.001 ceramic	C311(C361)	1-105-673-12	0.01 mylar	RT301 (RT351)	1-224-489-00	2.2k, adjustable (dc bias adj.)
Q310(Q360)	2SC1670		C101(C151)	1-121-913-11	3.3 25 V mylar	C312(C362)	1-105-679-12	0.033 mylar			
Q311(Q361)	2SJ18 (FET)		C102(C152)	1-105-661-12	0.001 mylar	C313(C363)	1-105-661-12	0.001 mylar			
Q312(Q362)	2SK60 (FET)					C314(C364)	1-105-661-12	0.001 mylar			
Q401	2SC634A										
Q402,Q403	2SC1124					C401	1-125-093-11	4700 50 V			

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
RT401	1-224-250-00	2.2k, adjustable (power voltage adj.)
RV201 (RV251)	1-224-505-00	250k(S), variable (VOLUME)
RV202 (RV252)	1-224-577-00	10k, variable (BALANCE)
RV203 (RV253)	1-224-576-00	50k, variable (TREBLE)
RV204 (RV254)	1-224-575-00	50k, variable (BASS)

SWITCHES

S1	1-516-695-00	Rotary (FUNCTION)
S2~S4	1-516-603-00	Lever/Slide (MONITOR, TAPE COPY, EXT ADPT)
S5	1-516-685-00	Lever/Slide (MUTING)
S6~S12	1-516-694-00	Pushbutton, 7-key (MODE, LOUDNESS, TONE, HIGH FILTER, LOW FILTER)
S13	1-516-696-00	Rotary (SPEAKER)
S14	1-516-628-00	Pushbutton (POWER) (AEP model)
	1-516-693-00	Pushbutton (POWER) (USA model)
	1-516-697-00	Pushbutton (POWER) (E model)

JACKS

J101,J102 (J201,J202)	1-507-470-00	Phono, 4-P
J103~J105 (J203~J205)	1-507-430-00	Phono, 6-P
J106,J107 (J206,J207)	1-507-471-00	Phono, 4-P
J108,J109 (J208,J209)	1-507-470-00	Phono, 4-P
J110~J113 (J210~J213)	1-507-429-00	Phono, 8-P
J301,J302	1-507-454-00	EXT ADPT
J901	1-507-454-00	HEADPHONE

MISCELLANEOUS

CNJ001	1-509-549-00	Connector, REC/PB
CNJ1	1-509-546-00	Connector, 3-P; AC INPUT (E, AEP model)

CNJ1~CNJ3	1-526-528-00	Outlet, ac (USA model)
CNP1	1-534-754-00	Cord, power (E model)
	1-534-992-00	Cord, power (USA model)
CP401	1-231-057-31	Encapsulated Component (USA, E model)
CP402 CP403	1-102-355-11	Capacitor, ceramic 0.01 μ F 500 V
F401,F402	1-532-203-00	Fuse, 2AT (AEP model)
	1-532-268-00	Fuse, 2A (USA model (new type))
	1-532-363-00	Fuse, 2A (E model)
F401	1-532-312-00	Fuse, 4A (USA model (former type))
F403,F404	1-532-299-00	Fuse, 5AT (AEP model)
PL1	1-518-170-00	Lamp, power
Ph401	1-800-340-00	Thermistor (positive)
RL901	1-515-257-00	Relay
TM1,TM2	1-535-057-21	Terminal Strip, 4-P (SPEAKER) (E, AEP model)
	1-536-446-00	Terminal Strip, 4-P (SPEAKER) (USA model)
	1-506-370-00	Plug, PRE/POWER selector
	1-508-690-00	Plug, voltage selector (USA model)
	1-509-667-00	Socket, transistor
	1-536-354-00	Pin, terminal

ACCESSORIES AND PACKING MATERIALS

<u>Part No.</u>	<u>Description</u>
X-3701-029-0	Card Ass'y, warranty
1-506-113-00	Plug, shorting
3-429-126-00	Bag, polyethylene; unit
3-701-020-00	Bag, polyethylene; instruction manual
3-701-730-00	Bag, polyethylene; IBM card
3-701-742-00	Card, IBM
3-780-508-21	Manual, instruction (USA model)
3-780-508-11	Manual, instruction (AEP model)
	Manual, instruction (E model)
3-793-807-11	Schematic Diagram
4-839-225-00	Carton
4-839-226-00	Cushion